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ABSTRACT

Appreciation and concern for the preservation of our natural resources by all citizens is the primary concern of this teacher's guide for use in grades three and four. It employs the use of a filmstrip in conjunction with a local nature trail, to guide students in developing awareness--by looking closely, listening, touching, and smelling. The filmstrip is explained in its entirety, illustrating each frame and its accompanying script. Questions in the script are designed to encourage class discussion during the viewing time. Bracketed paragraphs provide the teacher with additional information. Also provided is an outline of ideas which appear in the script touching upon spring changes, habitat, effects of man on the environment, and past occurrences. This work was prepared under an ESEA Title III contract. Filmstrip not included. (BI)

1

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EXPLORING HO-NEE-UM IN THE SPRING

ED049914

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"EXPLORING HO-NEE-UM IN THE SPRING"

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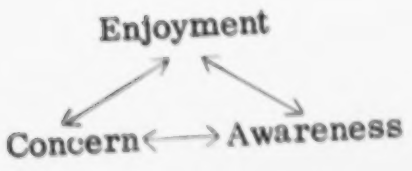
OBJECTIVES



Enjoyment — A tour should be a happy experience for the child.

Awareness — A tour should encourage discovery. A child becomes aware by using all his senses — by looking closely, listening, touching, and smelling.

Concern — Appreciation and concern for preservation of our natural resources is essential for all citizens.

EXPLANATION OF MATERIALS

Ho-nee-um Trail

A portion of the Arboretum within the city limits of Madison was chosen for development of a nature trail suitable for use by school classes. Seasonal and special emphasis slide tours of the area are planned for use by classes preparing for an actual trip. Each tour emphasizes different themes — all chosen to promote the objectives above.

Inserted in the script are bracketed paragraphs providing the teacher with additional information. Questions in the script are designed to encourage class discussion during the viewing time.

For an actual walk along the trail at a leisurely pace at least an hour should be allowed.

BIBLIOGRAPHY

General:

Leopold, Aldo, Sand County Almanac
A delightful collection of essays ranging from sensitive descriptions of the inhabitants of the natural world to the author's thoughts about the land — a philosophy which has had far-reaching effects in the conservation field.

Milne, Lorus and Margery, Balance of Nature
Some examples of disastrous, though often well meant, interference by man in natural systems.

Sachse, Nancy, A Thousand Ages
A history of the University of Wisconsin Arboretum.

Watts, May T., Reading the Landscape
Story-like explanations and charming sketches which give the reader a new historical and ecological understanding of the natural landscape.

Specific:

Archbald, Dave, Quick Key to Trees
Emlen, John and Archbald, Dave, Quick Key to Birds
Easy method of identification and fun for children.

Barker, Will, Familiar Insects of America
Life histories of common insects.

Golden Nature Guide Series
Insects — Non-flowering Plants
Mammals — Pond Life
Simple identification to common species.

Jackson, H.H.T., Mammals of Wisconsin
Information and pictures

Peterson, R.T., Field Guide to the Birds
A complete guide to bird identification.

Badger History resource unit "Wisconsin Indians" has a good chapter on "The Woodland Indians" written for classroom use. It is available from the State Historical Society, $1 single copy. Ten or more $.50 each.

Suggested Books for Children:

Boulton, Rudyerd, Traveling with the Birds

Buck, Margaret, In Ponds and Streams

Darling, Louis, The Gull's Way

Headstrom, Richard, Adventures with a Hand Lens

Hess, Lilo, Foxes in the Woodshed

Hutchins, Ross, The Travels of Monarch X
The Amazing Seeds

Podendorf, Illa, True Book of Insects

Rounds, Glen, Rain in the Woods and Other Small Matters

Sterling, Dorothy, Story of Mosses, Ferns, and Mushrooms

Publications:

Pope, Clifford, H., "Turtle", Audubon Nature Bulletin

Sowls, Lyle K., "Life in Freshwater Marshes",
Audubon Nature Bulletin, 1962

OUTLINE OF THEMES

These are ideas which appear in the script. Children should be encouraged to add their own observations related to the different headings.

Spring changes

Melting ice and snow
Earthworm castings
New growth:
- Leaves on trees and shrubs
- New needles on tamarack
- Water lily pads on water
- Seedlings of wild cucumber
- Nettles

Blossoms on trees and shrubs:
- Shadbush, bur oak, poison ivy, cottonwood, American elm, box elder, high bush cranberry, pussywillow

Spring wildflowers:
- Violets, bloodroot, white trout lily, marsh marigold

Bird migration:
- Some passing through: hermit thrush, ducks
- Some arriving to build nests: robin, catbird, oriole, mallard

Appearance of chipmunks

Habitat ideas — (some things which wild plants and animals need)

Robins need good worm hunting areas.
Birds need bushes for "cover", food, nesting.
Birds and animals need water.
Migrating birds need safe stopover places.
Some animals and plants need wetland areas.
Turtles, toads need different habitats at different stages of their lives.
Woodland wildflowers need undisturbed woodlands.
Fish need unpolluted water to live in.

Some effects of man

Lawn mowing, parking lots
Use of DDT
Creation of a refuge
Planting of shrubs and trees: in yards, in refuges, in hedgerows
Causing wildflowers to become scarce
Planting (and protecting) wildflowers
Plowing of prairies
Laws to protect song bird nests
Building of Council Ring
Building streets and houses (effects on spring water)
Draining of marshes (effects on wildlife and lakes)
Use of land to produce special food crops for large population
Pollution of lakes
Littering

Glimpses of the past

- Glaciers
- Invasion of bare land by plants
- Indian times:
  - Prairies with a few open-grown oaks
  - Prairie fires
  - Use of native plants and animals by Indians: bloodroot, nettle, red dogwood, ducks
  - Village located near the spring
- Pioneer times:
  - Location of inn near the spring

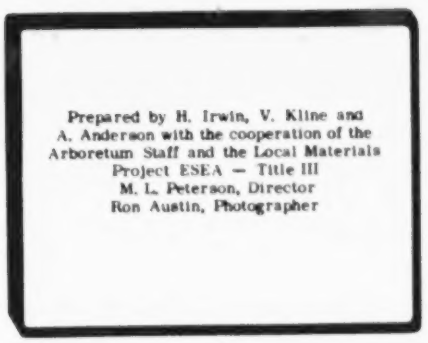
1
Colophon
(Bird calls.)

SPECIAL NOTE:

Please do not judge the quality of the beautiful full-color pictures in the Filmstrip by the appearance of the black-and-white photos in this Guide! Obviously, there is no comparison between full-color and black and white pictures.

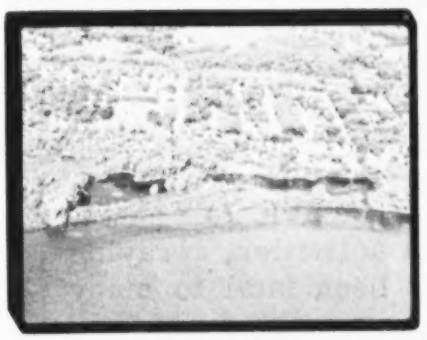
2
Title Frame

Recommend Grade level 3-4; Teachers should show only part of the set during each class period to allow time for student discussion.


Prepared by H. Irwin, V. Kline and
A. Anderson with the cooperation of the
Arboretum Staff and the Local Materials
Project ESEA — Title III
M. L. Peterson, Director
Ron Austin, Photographer

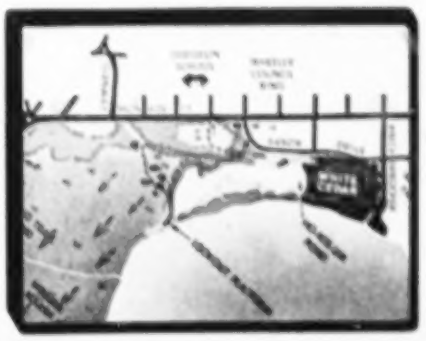
3
Credit Frame
(Bird calls.)

Note: Teacher's supplementary materials are included in brackets following narrative script.



4
Within the limits of the city of Madison, but wondrously removed from the city bustle, a narrow island shelters a small pond.

A comparison with the map on the next slide will identify some of the distinctive landmarks: Dudgeon School, Monroe Street, the large island, Lake Wingra and Ho-nee-um Pond.



5

Situated across Monroe Street from Dudgeon School, the island, the pond, and the mainland near the pond are part of the University of Wisconsin Arboretum. A trail provides opportunities for exciting discoveries at any time of year.

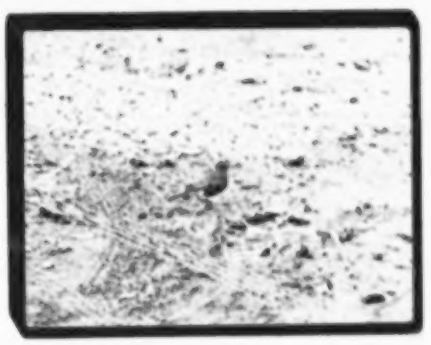
A printed map of the Arboretum posted in the Ho-nee-um parking area is available at a small cost from the Arboretum office. At the back of the teacher's guidebook is a map of the marked trail to be used as a transparency master or for individual student maps.

6

When spring begins at Ho-nee-um, melting ice and snow make artisitic patterns. Rapidly changing scenes will unfold as the plants and animals respond to warmer and longer days.

The spring season advances rapidly, each day bringing new changes in the area. These pictures attempt to give an idea of what kinds of things may be seen, but the time of the trip will determine what will actually be discovered.

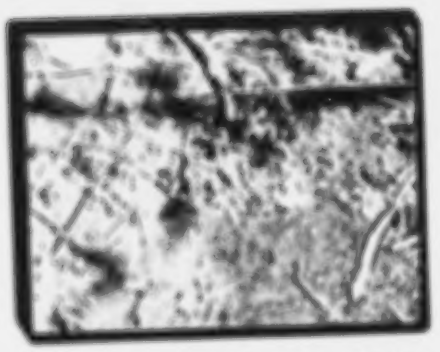
A suggested classroom activity would be to record on the class calendar spring events observed in the neighborhood.



7

Even before the snow has melted, the cheerful song of the robin can be heard. Most of our robins spend the winter farther south and fly north in flocks in early spring. At Ho-nee-um, robins are often seen on the mowed lawn and along the cleared areas such as trails and parking lot. What are they hunting for? Do you think that some of man's activities may help the robins find food? Which of man's activities might harm robins?

Robins are an example of a bird which appears to have benefited from such activities as farming and lawn making. Worm hunting is easiest where soil is uncovered or grass is kept short. One of man's more recent activities, spraying city trees with DDT, has been fatal to many robins.



8

Here is a sign of a creature which robins like to find and eat. The earthworm takes in soil along with decaying leaves and other dead plant material. What is not used for food passes through its body and is deposited at the surface in these little mounds of soil which are called "earthworm castings". Earthworm castings are one of the first signs of spring. As soon as the ground thaws, the worms move up from their deep winter burrows. You may want to watch and record on your classroom calendar the day on which the first earthworm castings appear in your neighborhood.

The mound of worm castings is about the size of a nickel. The activity of earthworms loosens and enriches the soil. If the children observe a robin before sighting the first earthworm sign, they may wish to discuss what else robins could eat which would be available — such as last year's berries.

9

The trail begins at the parking lot where many shrubs are growing. These provide "cover" or places of safety for birds and animals. Very early in spring, before leaves are showing on the trees, one of the shrubs bursts into bloom.

The script and pictures will proceed along the trail in the order indicated on the trail map. At school beforehand and in the parking lot before the tour begins, a review of tour manners might be helpful. Some rules might be:

1. Stay behind guide or teacher.
2. Walk quietly.
3. Use eyes and ears.
4. Do not pick plants or disturb the animals.
5. Do not drop litter.

10

Looking closely, we can see the narrow petals of the flowers of this shrub. It is called shadbush.

In the eastern United States fish called shad swim up the streams to spawn at the same time as this shrub or small tree blooms; hence the name "shadbush". Other names for the same shrub are "Juneberry" and "serviceberry".

11

Before long, leaves will appear on shrubs and trees and soft greens will catch the sunlight along the trail, which leads us first to . . .

12

. . . Ho-nee-um Rock. This large boulder was delivered to this spot by a glacier — a powerful, grinding, bulldozing river of ice which moved down from the north thousands of years ago and then slowly melted. Can you see something about the shape of this rock which tells us that it was bumped and shoved along by a glacier? Can you imagine how the bare ground looked right after the glacier melted? What happened to the trees and other plants which were here before the glacier? How did new plants get started? How many things can you think of which might have happened here since that time?

The chipped off and rounded corners are evidence of glacial action. Glaciers destroyed the plant life, leaving the bare ground exposed. Seeds from areas not covered by glaciers were carried by wind, birds, and animals to the exposed earth. The most recent glacial advance in this area ended about 20,000 years ago. This glacier greatly affected our present landscape for it created our famous lakes, including Lake Wingra, leveled off some of the hills and deposited soil and rocks. It moved from the northeast as far as the Madison area. Southwest of Madison (Dodgeville, etc.), the land forms are those of an unglaciated area. Since the time of the glacier, different kinds of plants and animals have come and gone; Indian tribes have camped nearby; pioneer farmers have used the land; a city has grown within a hundred feet.

13

One exciting thing happened here about 30 years ago. (Quite recently from the point of view of a boulder!) That was the time that the area we call Ho-nee-um became part of the University of Wisconsin Arboretum. Dredges were used to create the pond and the long island as a special refuge for birds and other animals. Can you imagine how the island and the shores of the pond looked at first? Once again the plants began to grow on bare earth — some spreading in naturally, others planted according to a careful Arboretum plan. Today, it's hard to imagine

that the island and the shore were ever without a dense cover of shrubs and trees. Today, the island, pond, and the mainland near the pond have truly become a refuge for the plants and animals which live there.

Before it became part of the Arboretum, a real estate development was contemplated for the area.

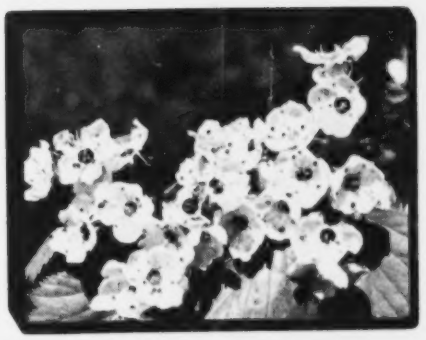
14
The carved letters on the rock in the clearing remind us of this. "Ho-nee-um" is the Winnebago Indian word for a refuge or sanctuary.

See "Winnebago Indians of the Four Lakes Area" in the teacher's guide for "Legends of Lake Mendota".

15
Across the clearing from the rock grow two large bur oak trees. Notice the out-stretched branches growing quite low, which tell us that these trees have always had a great deal of light. They were never crowded by other trees. What is the shape of trees which grow in a forest? The first settlers to come to Dane County found a land of open grassland called a prairie. Here and there in the prairie grew a few widely spaced oaks — which must have looked like the trees we see here. You will want to look at the thick bark which would protect such a tree from the fires which burned through the prairies when the Indians lived here. What has happened to the prairies which were here?

The side branches of forest grown trees are shaded out and die while still small, so that a forest grown tree develops a tall straight trunk with branches mostly at the top where the light is. Most of the prairies which once covered much of Dane County have been plowed, yielding some of the richest farmland in the country.

16
This picture of the same trees was taken a little later in spring. What changes do you see? How many plants seem to be in bloom in this picture? Let's look closely at three kinds of flowers which are in the picture.



17
One of the bushes has white flowers . . .

Hawthorne

18
. . . and another has pink.

Crabapple

19
The yellow color of the bur oak is due to young leaves and long dangling catkins of tiny yellow flowers. Perhaps something else will be blooming on the day you visit Ho-nee-um so that you will discover a different beautiful pattern when you look closely.

20
Three large trees can be seen across the clearing from the bur oaks. In very early spring these "Three Sentinels" as the trees are called, look like this. Compare this picture to . . .

For those especially interested in identification the three trees left to right are box elder, bur oak, and hackberry.

21
. . . a later one of the same trees. What changes do you see?

22
Poison ivy can be seen near Post #4. In very early spring it looks like this.

> Contact with any part of a poison ivy plant may cause a rash in susceptible persons. Note: Non-susceptible persons may develop the allergy after contact with the plant. A subsequent exposure will then result in a rash. The best protection is to know what it looks like and avoid it. At Ho-nee-um this one patch is allowed to grow so that boys and girls can learn to recognize it.

23
Later the leaves grow larger . . .

24
. . . and turn green. Are all the leaves shiny? Does poison ivy have flowers?

> The greenish flowers of poison ivy appear on a small stalk below the leaves and can be seen in this picture. The flowers will develop into white berries.

25
For several days each spring the path to the Council Ring is strewn with red catkins. Do you know where these come from?

26
Looking up gives a clue. They are clusters of the male flowers of the cottonwood tree. Do you know why the tree is called "cottonwood"? The female flowers remain on the tree and develop into seeds surrounded by a cotton-like material which helps the seeds travel long distances in the wind.

27
Many of the seeds fall on the pond and for several days cotton-like material floats on top of the water.

28
Does it surprise you to know that such large trees have flowers? All of our street trees have flowers, but few people notice them. Here are the tiny flowers of a common street tree, the American elm. Have you seen any tree flowers in your neighborhood?

Most street trees bloom very early. The flowers are very small, so that the children will have to look closely to discover them.

29
Next stop is the Council Ring, a good place for looking and listening. What will you discover? An insect? Moss? An acorn? A branch with buds? A flower?

The Council Ring is a good example of man-made architecture enhancing a natural setting. The following information is from A Thousand Ages by Nancy Sachse, page 46. "Four years later an even larger pond, Ho-nee-um, was dredged on the north shore. Besides this undertaking in 1938, Arboretum land holdings here were further enhanced by the Kenneth Jensen Wheeler Council Ring, a memorial to a young landscape architecture student who died on the eve of his graduation. The limestone ring was designed by Kenneth's grandfather, Jens Jensen, creator of the Clearing in Ellison Bay, Door County, and one of the early conservationists who assisted in the formation of National Park policy under Theodore Roosevelt. Supervision of the labor and much of the stonework on the memorial was carried on by the boy's father, Edison Wheeler, and the Ring dedicated in a simple, moving ceremony the Sunday of Graduation Week."

30
Between the rocks of the Council Ring and under the trees grow some woodland wildflowers. An early blooming one is this white violet . . .

Canada Violet

31
. . . with pink buds and yellow centers.

32
Birds often are seen near the Council Ring, especially in spring, which is traveling time for many birds. Some of the birds seen in spring, such as the hermit thrush, are just passing through on their way from winter homes south of here to summer nesting sites farther north. Why is it important to have good places to stop such as Ho-nee-um? Where do you find food and shelter on a long trip?

The hermit thrush is a little larger than our common English sparrow, and has a rusty brown tail which it raises slowly several times a minute. Birds need food, shelter and protection just as people do when they travel. Other song birds which are seen only during migration include kinglets, white-throated sparrows, and many of the warblers.

33
The catbird, like the robin, winters farther south and comes to our area to build a nest and raise a family. The song of the male bird announces the boundaries of the "territory" he is prepared to defend during the nesting period. Catbirds are good mimics and can imitate the songs of other birds. (Hold for the Catbird's song.)

Children don't have to be able to identify the birds in order to enjoy hearing bird songs. If more than one bird is heard, have them notice differences in lengths of song, pitch, quality — sharpening ears rather than compiling a list of birds is a good goal for beginners.

34

Catbirds, like many other birds, need areas with bushes in which to build their nests. Sometimes they build in city neighborhoods where bushes have been planted. Are there some birds which nest in your neighborhood? How can boys and girls help nesting birds? In the country many farmers now have "hedge-rows" — rows of bushes along roads and fences. Does this help the birds? Do the birds help the farmer?

Plantings which supply "cover" and nesting sites increase the number of birds using an area. The birds help in control of insects. Children should learn to avoid disturbing nesting birds. Watching quietly from a distance will enable them to learn something about the habits of birds.

Collection of songbird nests without a permit is a violation of state law. Removal of any material from the Arboretum is forbidden.

35

The steps down the slope from the Council Ring take us to the spring. Because this spring was a good water supply the Indians had a summer camp nearby — right where Monroe Street and the front lawn of Dudgeon School are today. Pioneers stopped to refresh themselves here too, and when an inn was built across Monroe Street, water for the inn was carried from the spring in oaken buckets on a carrying yoke. Can you tell which of the rocks in this picture were brought here by the glacier?

The rounded rocks show evidence of travel-by-glacier. The rocks which are in layers and have sharp corners were formed here when this area was beneath a shallow sea and have not been moved by a glacier.

17

The Plow Inn, 3402 Monroe. This is the site of a stagecoach inn built in 1836. The present building has many features of the original inn. Notice the green shutters.

36
Today the water is no longer safe for people to drink and the spring sometimes is dry. What changes in the use of the land nearby might explain this? Where do the people who live here today get their water? Where do you get your water?

Rain water percolating through the ground finds its way into the rock layers beneath. Some of these rock layers are more porous than others and the water reaching one of these flows along the layer as a sort of underground stream. When the layer is interrupted as by erosion forming a hillside, the water runs out and continues on its way above ground. Today much of our rainwater is caught on streets, gutters, playgrounds, roofs, etc., and finds it way into the storm sewers rather than going into the soil. The storm sewers empty into the lakes. Madison gets its water from wells which pump water from layers of cambrian sandstone lying beneath the city. This water-bearing sandstone is one of Dane County's most valuable natural resources.

37
When the spring is flowing, it provides a favorite drinking and bathing place for birds and animals, such as the bright orange and black Baltimore oriole. Orioles build hanging nests high in a tree, often choosing a branch which arches over a clearing or over water — or even over a city street. (Hold for Oriole's call)

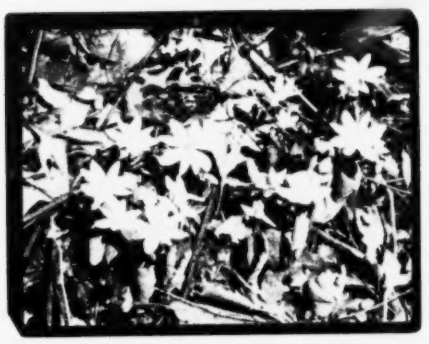
Because of the variety of habitat and the availability of water, Ho-nee-um is one of the best places in the Madison area for observing birds.

38
Below the spring the trail leads across a footbridge and through the woods.

After crossing the footbridge stay on gravel path going straight (no left turns!) all the way to the marsh marked by the Wisconsin Wildlife Refuge Sign. Some of the trees along this stretch are aspen, box elder, walnut, and silver maple.

39
Some spring wildflowers bloom in the woods. One of the earliest is bloodroot which pokes through the ground with a leaf wrapped around the flower stalk as if to protect it from the cold.

40
Each bud becomes a beautiful white flower. The sap of this plant is bright red-orange. Indians used it as a dye and for war paint. The thick root of bloodroot is full of the bright sap.



41
Wildflowers such as bloodroot were once plentiful wherever there were woodlands. Why are they scarce today? Today in special places such as the Arboretum wildflowers are being planted so that people can once more enjoy them. How can we help wildflowers to survive?

> Reasons for scarcity of woodland wildflowers include grazing of farm animals, clearing of woodlots, urbanization. Picking of wildflowers prevents seed production and in some cases (i.e. trillium) destroys the plant because the leaves are picked with the flower.

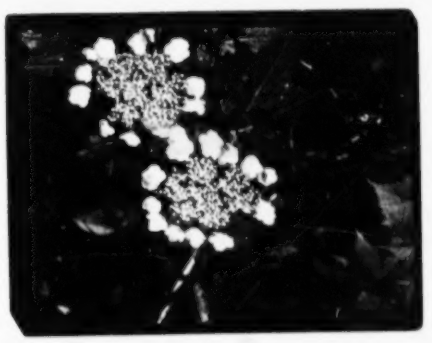
42
White trout lily is a woodland wildflower which forms large patches of spotted leaves if undisturbed for many years. Look for two large patches of the spotted leaves . . .

> Trout lily is an example of a spring "ephemeral" — a plant which comes up early before the tree leaves appear, makes food (much of which is stored in the roots to enable it to come up quickly again next year), produces flowers and seeds, turns "fall" color and disappears underground by June when the tree leaves shade the forest. It thus avoids the problem of shade but has a very short growing season.

43
. . . near this hollow tree, which is a landmark along the woodland trail.

44
When you find the large patches of spotted leaves look closely at the flowers of white trout lily.

45
A little later in spring, box elder trees along the path produce dangling flowers which move with every breeze, . . .



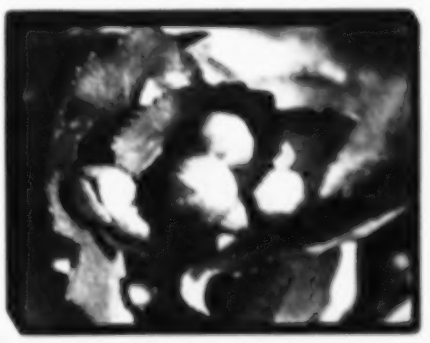
46
. . . and still later this bush, high bush cranberry, produces its clusters of flowers. Notice the outside circle of larger white flowers which serve as beacons outlining the "target" of smaller flowers in the center. Insects such as bees which are attracted may bring pollen from another high bush cranberry. If this happens the small center flowers will produce berries.

> High bush cranberry is one of many native shrubs which are good landscaping material and are often planted to attract birds.

47
A woods includes not only the trees and other plants but also the animals which live there. Here is a common animal, the chipmunk, with cheek pouches full of some woodland treat.

48
After coming out of the woods, the trail turns left, and leads through an open wetland. The ground beneath is springy and a chorus of spring birds is heard. (Hold for bird calls.)

Many animals and birds live here. Wetlands are important refuges for wildlife. People who study lakes tell us that the wetlands next to a lake are important too in keeping the lakes healthy. Today two-thirds of the wetlands in Dane County have been drained or filled. Efforts are being made to save those which remain. The wetland at Ho-nee-um will be preserved because it is part of the Arboretum.



49
Here is something which you may see along this part of the trail. These large round buds will become . . .

50
. . . bright yellow flowers which glow in the early spring sunshine.

> Note the different number of petals on the two flowers. Marsh marigolds have a variable number of petals, even on the same plant.

51
Marsh marigold, as the flower is called, is a plant which grows in wet places and thrives with "wet feet".

> Marsh marigold is also called "cowslip".

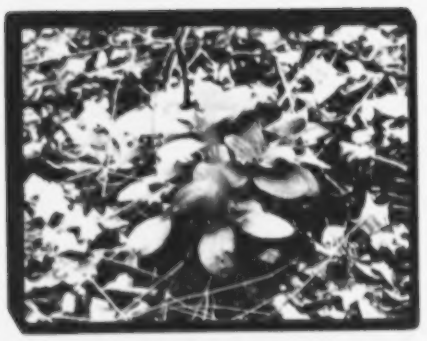
52
You will see other plants which grow in this wet place. How many different kinds of plants can you see in this picture? Can you describe each one? The plant with toothed leaves on the right in the picture, stinging nettle, has prickly stems and leaves, but the early settlers cooked the young plants as a spring green to eat.

The large fuzzy leaves in the center of the picture make up the spring "rosette" of Pennsylvania saxifrage. The small plants with round leaves are seedlings of giant ragweed just beginning to grow from seeds which fell on the ground last fall. By late summer, these plants will be taller than your head. You can see last year's stalks on the ground.

53
The tall stalks of older stinging nettles provided Indians with a fiber which was woven into fish nets.

54
Some small tamarack trees have been planted in the wet springy soil. A tamarack is an example of a wetland tree. It is unusual in that it has needles and cones, but is not evergreen. The needles turn golden yellow in the fall and then drop off. The branches are bare all winter. In spring new needles grow in little tufts as you can see here.

55
The trail leads through a moist area with many bushes. One of the bushes has red stems. It is called red dogwood. This is one of the plants the Indians used for making "kinnikinnick" or Indian tobacco. An Indian legend explains that the bush was colored red by one of their gods so that the Indians wouldn't make a mistake and gather the wrong bush.



56
Growing near the path is a plant which started from seed this spring. It is wild cucumber vine. It will climb up nearby bushes, growing very fast and attaching itself with spring-like tendrils.

57
Look for the tendrils, and for last year's wild cucumber pods in this picture.

58
The seeds from which the young plants grew fell out of these pods last fall.

59
A right turn takes us to the look-out platform. Here we can see Lake Wingra, an important source of food for Indians and early settlers. Wingra comes from an Indian word meaning "duck water". Does the lake provide food for people today? What is the most important use of the lake for Madison's citizens now?

This is a place to look up at the sky, across the lake to the far shore, and down at the plants along the water's edge.

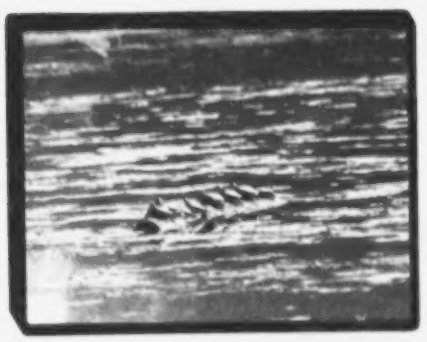
A large population cannot depend on the harvest of native plants and animals for its food supply. Food must now be produced in large quantities on farms with specialized crops and livestock. The most important use of the lake today is recreation, including not only water sports and fishing, but nature observation and pleasure driving along the shores.

60
Watch for ducks.

61
A few, like the mallard duck, will nest at Ho-nee-um. Most will nest in the wetlands of northern Wisconsin or Canada, and find this a safe place to rest and eat before continuing their long journey.

62
The trail from the platform leads along the edge of Ho-nee-um pond.

63
Pussy willows grow close to the water.



64
By the time the pussy willows bloom the turtles will be sunning on logs in the pond. Where have they spent the winter? Where do turtles begin their lives?

Turtles spend the winter buried in the soft mud beneath the pond. Eggs are laid in holes dug by the females on dry land, so young turtles begin life on dry land.

65
The leaves begin to turn green along the edge of the pond.

66
Before long children discover toads hopping across the trail. Where does a toad spend the winter? Where does a toad begin life? Does a toad need more than one kind of place to live? What other creatures may start life in a pond?

Toads also use the soft mud in the pond for winter protection. Toad eggs are laid in shallow water and the young toads spend the first part of their lives there as tadpoles. Frogs also begin life in a pond, as do many insects such as dragon flies and mosquitoes.

67
Here you can see some plants which grow right in the water. Water lily leaves shade the water and help keep it cool. Fish are often found where there are water lilies. Can you see a place on the bottom where the debris has been cleared away? A male fish has fanned away the soft materials on the bottom to make what is called a "fish nest". Female fish will lay eggs in this clear spot. The male fish will continue to keep the area clear and guard the eggs. Fish and other animals which live in a pond or lake may be affected by the growth of a city nearby. Can you think of some things that people do which may affect the life in a pond or lake?

This making of the "nest" by males is typical of sunfish and blue gills. Water quality in lakes is affected by sanitary sewage effluent, storm sewer runoff, industrial wastes, runoff of manure and fertilizer from farm fields and lawns, siltation, litter, etc.

68
It isn't hard to tell what sort of creature has been here. This activity affects both water and land. Is there any animal besides man which leaves this kind of waste? Paper decomposes so slowly that it takes many years before it becomes part of the soil. Aluminum is one of the most long lasting materials known. Man, who can design such containers, must be responsible for planning ways of disposing of them.

69
An area such as Ho-nee-um can be preserved and kept as a beautiful refuge by people who care and understand — boys and girls, men and women, . . .

70
. . . so that it can be a place where plants and animals can live together — observed, but undisturbed, . . .

71
. . . a place where boys and girls — and their parents and teachers — can make exciting discoveries at any time of the year.

72
Come often. (Hold for bird calls.)

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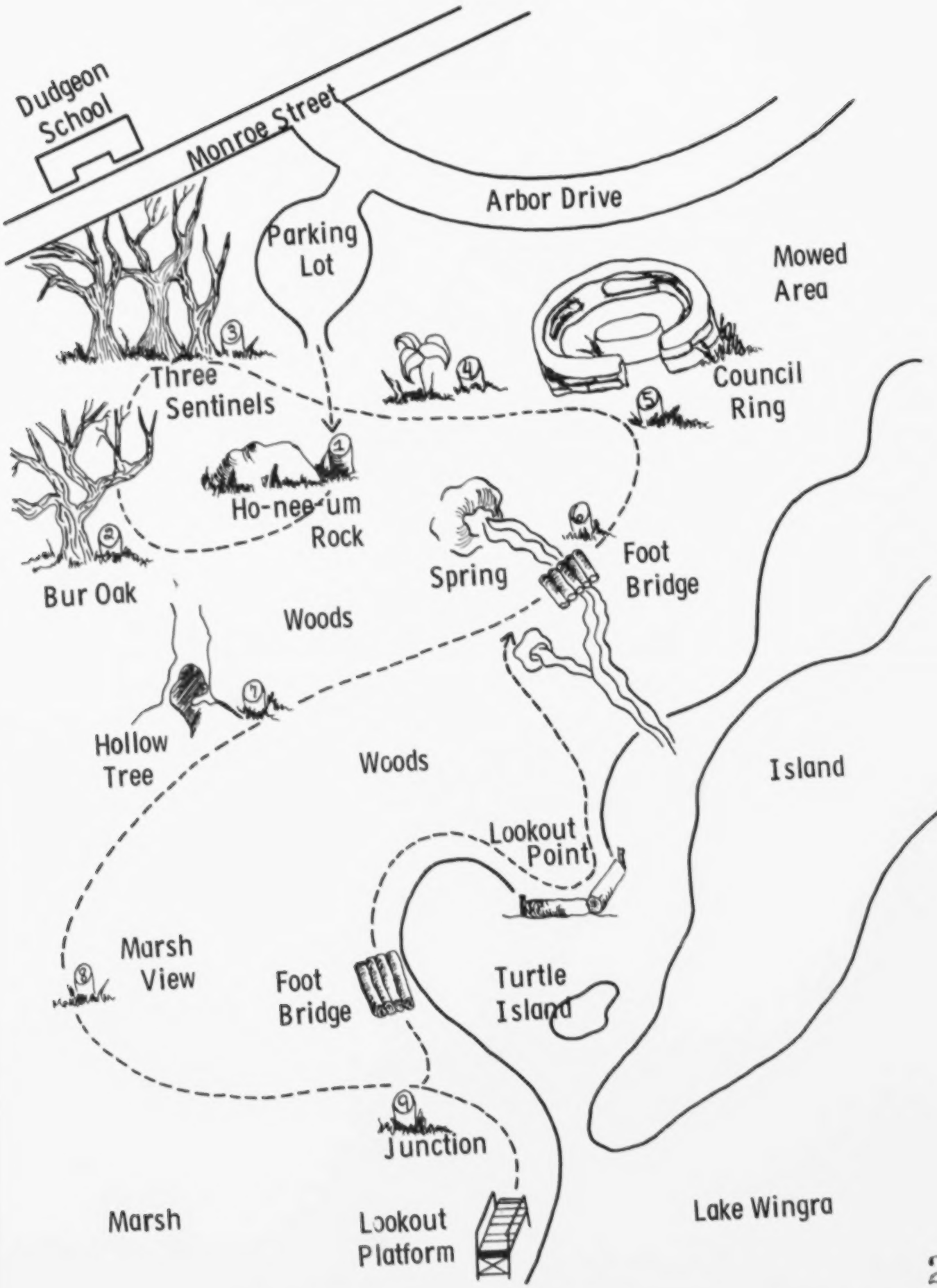

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